Determining a relationship between higher education financial position and tuition discount rates

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ABSTRACT

Institutions have increased the practice of tuition discounting, that is, the strategic use of price discrimination. During the past 30 years, both the average percent discount given to students and the proportion of students receiving tuition breaks have increased. As this practice has increased, there are financial determinants and implications that must be addressed. The purpose of this study was to conduct a thorough investigation of one of the issues embedded within tuition discounting practices: the relationship between an institution's overall financial position and its price discrimination practices. The five component ratios of the financial vulnerability index (FVI)—debt ratio, revenue concentration index, surplus margin ratio, administrative costs ratio, and size ratio—served as a proxy for institutional financial position. Ordinary least-squares regression was used to test the data. There were two main findings. First, institutional financial position had a relationship to tuition discount rates for stable institutions (FVI < .10). As the FVI decreased for stable institutions, tuition discount rates increased, showing that institutions with financial resources used these resources to create a class that would further their mission, increase prestige, or use a combination of the two. Second, institutional financial position had a relationship to tuition discount rates for unstable institutions (FVI > .20). As the FVI increased for unstable institutions, tuition discount rates increased, indicating that institutions used their current resources as an investment in the future of the institution.

Keywords: financial position, financial stability, tuition discounting, higher education, financial vulnerability index

INTRODUCTION

Since 2007, the financial crisis, often referred to as "the Great Recession" (Rampell, 2009), has magnified the financial constraints on college students. The decrease in available resources from all sources due to the credit crisis (Wilson, 2008) has continued to encourage the practice of tuition discounting, often favoring middle- and upper-middle-income students (Toutkoushian, 2001) and potentially bringing financial difficulties to an institution in future years (Davis, 2003; Redd, 2000). The findings in this study contribute to an understanding of the links between financial position and tuition discounting practices and their consequences.

The areas of budgeting, strategic planning, and decision making are of the utmost importance to an institution. Poor application of these elements can harm institutions to the point of closure (Meisinger, 1994; Van Der Werf, 2000). An institution may not have the tools necessary to identify and correct small problems before they become threatening to institutional viability. The study results provide institutional decision makers with more detailed information about the types and characteristics of institutions that are more likely to be financially vulnerable. Results also provide insights into how tuition discounting practices may compromise short-term financial position and, potentially, long-term stability.

A more comprehensive understanding of the financial underpinnings of tuition discounting, in light of the institutional financial position, may inform and guide individuals involved in the accounting, budgeting, and strategic financial planning of institutions. The quantitative model resulting from the study can help when examining an institution's tuition discount rate in relation to its financial performance.

TUITION DISCOUNTING

Tuition discounting is, in essence, a form of price discrimination. Universities charge different prices for different students while offering the same educational opportunities at the institution. Tuition discounting is a long-standing practice among private institutions of higher education (Baum & Lapovsky, 2006). In pre-colonial America, higher education was a luxury enjoyed only by the wealthy, as tuition was expensive and due in full prior to the start of the term (Nidiffer, 1999). Currently, institutions implement financial aid policies including tuition discounting to provide many students with the financial means to attend college that they would not have had under historical circumstances. The amount of the discount that each institution offers is dependent on its financial resources and the choices made by its leadership.

Resource dependence theory asserts that, based on the need for resources, demands and pressures from external actors constrain and shape organizational behavior, which can significantly affect how an organization conducts business (Pfeffer & Salancik, 1978). As such, resource dependence theory offered an appropriate theoretical framework to describe and explain the financial operations and decision making of higher education institutions. For example, institutions must decide how to allocate the limited funds available for all of its necessary functions, including instruction, construction, and maintenance of facilities as well as institutional financial aid, to name a few. As background to this discussion, the literature on how the concept of tuition discounting has been operationalized and defined is presented.

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Financial Definition of Tuition Discounting

The definition used in this study for tuition discounting is that of the Scholarship Allowance (Allan, 1999). The Scholarship Allowance is the waiver of some or all of the tuition due and is usually in the form of an institutional scholarship or grant plus tuition payments funded by gifts and endowments. Scholarship allowance is the tuition discount definition used by the National Association of College and University Business Officers in its tuition discount surveys. This is also the definition included in the Financial Accounting Standards Board rules on tuition discount reporting in institutional financial statements (Allan, 1999) and is the definition most commonly used in the scholarly literature (Baum & Lapovsky, 2006; Davis, 2003; Lapovsky & Loomis-Hubbell, 2003; Morgan, 2002; Redd, 2000).

HOW INSTITUTIONS ADOPT TUITION DISCOUNTING

The traditional strategy adopted by private institutions is for higher-income students to pay more tuition in order to subsidize the lower-income students. This allowed access to students who could not otherwise afford to attend. While this may have been the case in the past, institutions no longer use this as the only method by which they award financial aid (Allan, 1999; Corey, 2005; Redd, 2000).

Smaller, less selective institutions may use financial aid packaging to meet enrollment goals. The public perceives the cost associated with this practice not only as an incentive for students to enroll but also as an investment in the future. The packages attract students, in general, and higher quality students, in particular, which, in turn, may increase the ranking, prestige, and perceived quality of the institution (Corey, 2005).

More selective or highly selective institutions can reach their enrollment goals with higher-income students who are in a position to pay full tuition. But such institutions also use scholarships to craft a class of students with a certain level of academic quality, to increase student diversity on campus, and help those students who cannot afford to pay full tuition (Allan, 1999; Corey, 2005). Many perceive these methods for awarding discounts as institutional altruism and as driven by the perception that institutions have a responsibility to promote access but many institutions use tuition discounting to attract the most qualified candidates (Goral, 2003; Winston & Zimmerman, 2000).

Conversely, there are at least three additional forces behind how institutions award tuition discounts that are more pessimistic and self-serving (Redd, 2000). First, because the middle class does not want to pay for the rising costs of tuition and student loan indebtedness, institutions have turned to merit-based grants. Second, institutions are under increasing pressure to award more aid to higher-income students to help offset the rising costs of attendance. Third, institutions often offer financial aid packaging for academically gifted undergraduate students in the increasingly competitive market, following merit as opposed to need criteria. Regardless of the policies for awarding tuition discounts, institutions must have enough resources to offer tuition discounts.

IMPACT OF TUITION DISCOUNTING ON THE INSTITUTION

Tuition discounts can be funded or unfunded. When the tuition discount is funded, the institution still receives the tuition revenue but from a source other than the student. Restricted

funds such as endowment earnings, donations, and other financial support pay the tuition. Therefore, the university does not have to use its unrestricted money from the general operating fund for tuition support and can spend those funds in other ways (Allan, 1999). This cycle of using endowments to fund scholarships can contribute to financial stability, but not all institutions have gifts and endowments to cover the entirety of the scholarships that the institutions offer.

When the tuition discount is unfunded, the institution must forgo the tuition revenue. This can jeopardize the financial position of the institution for two reasons. First, institutions do not receive 100% of the gross tuition when they offer a tuition discount, but their expenses do not decrease proportionately. Instead, the discount severely taxes the operating budget. To deal with this, institutions may either delay other expenditures in the short term or indefinitely which may have a future negative impact on the institution culminating in enrollment losses (Redd, 2000).

The scholarship is an informal financial commitment to the students for the time that they attend, usually four years. If the scholarships were to decrease, retention could become challenged (Redd, 2000). Institutions must find a balance so they can provide tuition discounts without jeopardizing their future financial stability. While the source of funding is an important financial pressure, institutions might not investigate how to fund the discounts and, instead, might concentrate on their expected results.

For example, tuition discounting does not always raise institutional revenues (Davis, 2003). In 2000, 81.4% of students received some form of tuition discount, compared to only 63.0% in 1990 (Lapovsky & Loomis-Hubbell, 2003). When colleges increase their discount rate, they forgo tuition revenue, lowering the amount of funds available for educational programs. As institutions devote more funds to scholarships and financial aid, gross tuition (charge before discounts) must grow much more quickly to pay for program costs and overhead (Allan, 1999). As tuition costs increase, the discounts must be deeper to attract students. This appears to be an increasing trend (Allan, 1999; Redd, 2000) and brings about the need to evaluate the financial effect of tuition discounting, particularly at the institutional level.

FINANCIAL POSITION

The relationship between tuition discounting and the financial stability of an institution has received little attention in the literature. Available research has examined tuition discounting trends, general differences between institutions, and the sustainability and viability of institutions, but not strictly the financial implications of various tuition discounting practices.

Definition

The financial position and stability of higher education institutions are often determined using financial ratios, which measure many aspects of an institution's fiscal soundness. These ratios, when properly analyzed, can bring to light the strength or weakness of institutional financial statement line items or ratios compared to industry standards. Financial ratios represent the effectiveness of the institution's use of resources, ability to live within its means, and ability to provide and maintain quality educational services and facilities, as measured by industry standards and benchmarks (Prager et al., 2005). Specifically, this study uses the

Financial Vulnerability Index (FVI) as this ratio measure for financial position and stability. The rationale behind the use of ratio analysis and the FVI is discussed in detail below.

Trends

As discussed earlier, tuition discounting is a means for institutions to compete for the most qualified candidates (Goral, 2003; Winston & Zimmerman, 2000). The average discount rate for undergraduate students increased almost 10 points at private four-year institutions from 1994-95 to 2004-05 (Baum & Lapovsky, 2006). The percentage of students receiving scholarships increased almost 20 points from 1990-91 to 2002-03 (Lapovsky & Loomis-Hubbell, 2003).

Researchers do not know precisely how institutions have been able to afford this because institutional financial statements do not indicate that expenses have outpaced net revenues. Tuition revenue increased, but the increases were offset by increased tuition discounts. Perhaps the accurate explanation of how institutions remain financially stable may be discernable only from student-level data, including the mix of full-pay international students (Van Der Werf & Sabatier, 2009), which are not publicly available to researchers (Baum & Lapovsky, 2006).

An alternative explanation for why the financial statements do not indicate a potential problem may be that the tuition discounts are, in fact, unfunded. In this case, officials may stretch the operating budget to handle the institution's growing expenditures, thereby postponing ordinary and necessary expenditures. This would decrease expenses in the short-term so that the institution can sustain itself on its net revenue. If that were the case, it would cause neglect of the enterprise infrastructure or the physical plant and could have long-term ramifications (Redd, 2000; Wilson, 2008).

Financial Stability

Gifts and endowments do not fund the majority of tuition discounts. Instead, discounts decrease net revenue to the institution because they are unfunded and paid for through tuition from other students (Davis, 2003; Redd, 2000). This means that enough students must be full-paying to fund those who receive the scholarships. It also encourages institutions to increase their prices.

In addition, institutions showing larger increases in discount rates are the ones most dependent on tuition and fee revenue to finance their basic educational operations. But that same category of institutions loses money on each student due to its increased spending on institutional grants. This loss is equivalent to negative tuition because the institution effectively pays students to attend instead of charging them to attend. One quarter of all four-year private institutions are in this situation (Redd, 2000). In addition, one recent study showed that four-year public institutions experience diminishing revenue returns when unfunded tuition discount rates exceed 13% (Hillman, 2010). While some may view unfunded discounts and the resulting negative tuition revenue as an investment in the future of the institution (Corey, 2005), this is unlikely to be accurate in the long term. Yet the literature does not fully elaborate on how the financial position of the institution affects its decisions related to the award of tuition discounts.

Financial Ratios

Ratio analysis is a common tool used in business to analyze financial relationships and production data to determine how well a company performs compared to itself, its competitors, and its industry. This information also can determine whether the business is performing up to a certain standard (e.g., budget compared to actual results). When the results are poorer than anticipated, changes are necessary within the company to improve the results (Block et al., 2009).

Scholars had widely believed that higher education was too different from the business world to utilize the same tools, such as ratio analysis techniques, for institutional performance analysis (Kramer, 1981). However, institutions are increasingly exposed and more vulnerable to the conditions of the business and economic environments. They have responded by adopting more business-like operations and control (Deem, 1998); and, as such, researchers can scrutinize and analyze them like businesses as well.

A number of financial ratios are available and appropriate to analyze a for-profit business organization. Block et al. (2009) discussed four major categories of ratios: liquidity, debt utilization, asset utilization, and profitability. Liquidity ratios measure the entity's ability to pay short-term obligations as they become due. Debt utilization ratios measure the overall debt position of the entity related to its assets and earnings. Asset utilization ratios measure the productivity of the entity's assets. Profitability ratios measure the entity's ability to earn a return on its activities, whether from sales, assets, or capital.

These categories and ratios are relatively easy to understand because the goal or motivation of a company is usually profit centered or profit related. The mission of a higher education institution is different from that of a for-profit business: They typically emphasize stewardship and accountability rather than profit (Chabotar, 1989).

This different focus makes using for-profit financial ratios difficult, as the goals and value systems of higher education institutions as not-for-profit entities are different. Instead, specific financial ratios such as the available funds ratio, endowment income ratio, and instruction proportion ratio apply to the analysis of higher education institutions to accommodate their specialized missions and funding needs (Chabotar, 1989).

Financial Vulnerability Index

Trustees, presidents, and business officers take interest in the financial position of their institution. These officers are also interested in a more overarching evaluation of the institution, including whether it is financially vulnerable to an economic shock that could cause its closure. In other words, they believe in evaluating the financial stability of an institution. The FVI (Trussell et al., 2002), a measure based on financial ratios, was designed to determine the financial vulnerability or stability of a not-for-profit institution. This is accomplished through comparing institutional FVI results to established benchmarks by not-for-profit subsectors, including higher education, to accommodate the differences between each subsector.

The purpose of the FVI is to analyze the financial vulnerability of an institution at one point in time. As with other ratio analyses, its use over a period of time (at least five years) can help to determine a trend in an institution's financial position, i.e., whether the financial position of the institution is shifting and in what direction the shift is occurring (Block et al., 2009; Prager et al., 2005). Scholars have noted that the FVI provides only a gauge of the financial

component of the institution's stability, which is the focus of this research. Researchers and practitioners must consider other non-financial factors when determining the overall health of an institution (Chabotar, 1989; Prager et al., 2005). Discussion of the FVI appears in more depth in the methodology section.

RESEARCH DESIGN AND METHODOLOGY

A dataset was constructed using three main sources: (a) the U.S. Department of Education National Center for Educational Statistics (NCES) Integrated Postsecondary Educational Data System (IPEDS, 2003, 2004, 2005, 2006, 2007), (b) The Institute for College Access and Success (TICAS) database (CollegeInsight, 2003, 2004, 2005, 2006, 2007), and (c) *Barron's Profiles of American Colleges* (2003, 2005, 2007).

The time period under examination was the academic years 2003-04 to 2007-08. Obtaining enough years' data to perform a trend analysis was critical for this study. Business and accounting industry literature (Block et al., 2009; Prager et al., 2005) recommends a minimum of five years of information for trend analysis. Private, not-for-profit, baccalaureate level and above institutions in the United States (N = 1,244) were selected as the population of interest.

Variables

This section presents the rationale for including each set of variables by category. The independent variables were categorized into two groups, the main independent variables and the control variables. This section ends with a discussion of the dependent variable.

Main Independent Variables

The FVI includes five financial measures, each with component variables: the debt ratio (Debt), the Revenue Concentration Index (Concen), the Surplus Margin Ratio (Margin), the Administrative Costs Ratio (Admin), and the Size Ratio (Size). The Debt Ratio, expressed as a percentage, describes the amount of debt in the institution's capital structure (Trussel et al., 2002). It represents the proportion of debt the institution has in its capital structure in relation to its assets. An institution with a lower ratio is financially stronger.

The Revenue Concentration Index, expressed as a value between zero and one, expresses the number of revenue sources available and the diversification of the revenue streams of an institution (Trussel et al., 2002). As the number of revenue sources increases, the index approaches zero. If an institution had one revenue source, the index was one. Therefore, an institution with a lower number is financially stronger than an institution with a higher number.

The Surplus Margin Ratio, expressed as a percentage, is a measure of profitability and shows whether the institution is operating within its means (Trussel et al., 2002). It represents the ratio of the excess of revenues over expenses divided by total revenues. An institution with a higher surplus margin ratio is stronger than an institution with a lower surplus margin ratio.

The Administrative Cost Ratio, expressed as a percentage, identifies the proportion of institutional spending made for non-operational activities (Trussel et al., 2002). It represents the

amount of administrative costs in relation to total revenues. An institution with a higher ratio is stronger than an institution with a lower ratio.

The Size Ratio, expressed as a number greater than one, identifies the institution's financial size as a function of its total assets (Trussel et al., 2002). A larger Size Ratio indicates a larger asset value for the institution. An institution with a higher Size Ratio is stronger than an institution with a lower Size Ratio. Each of these five components is a continuous measure.

These five elements constitute the FVI, a representative composite measure of institutions' financial health. A comprehensive measure such as the FVI identifies more sources of variability than does a univariate measure such as net tuition revenue (Ruterbusch, 2004) or ending endowment balances that, by themselves, do not reveal the depth of complexity of institutional financial position (Prager et al., 2005).

After calculating each individual measure using the IPEDS and TICAS variables, the FVI was calculated using the following formula (Trussell et al., 2002):

$$\mathbf{FVI} = \frac{\mathbf{1}}{\mathbf{1} + e^{-z}} \textbf{ where}$$

z = 0.7754 + (0.9272 x Debt) + (0.1496 x Concen) + (2.8419 x Margin) + (0.1206 x Admin) + (0.1665 x Size), where

$$e = 2.718$$

$$Debt = \frac{Total\ Liabilities}{Total\ Assets}$$

$$Concen = \sum\left(\frac{Revenue_i}{Total\ Revenues}\right)^2$$

$$Margin = \frac{Total\ Revenues - Total\ Expenses}{Total\ Revenues}$$

$$Admin = \frac{Administrative\ Expenses}{Total\ Revenues}$$

$$Size = \ln(Total\ Assets)$$

Using this formula, an institution will generally have an FVI score between 0 and 1. An FVI score of less than .10 indicates that the institution is not financially vulnerable: it is stable. An FVI score of more than .20 indicates the institution is financially vulnerable: it is not stable. An FVI score between .10 and .20 is inconclusive regarding institutional vulnerability: evaluation of stability is not possible (Trussell et al., 2002).

Control Variables

To account for organizational and economic context, institutional differences are controlled for using a series of relevant variables. The control variables represent institutional characteristics or context relevant to financial aid and tuition discounting studies previously

performed. There are two groups of control variables: institutional economic controls and institutional characteristics.

Economic controls, the first group of control variables, includes Tuition & Fees (Toutkoushian, 2001). Due to the extreme collinearity between the various revenue stream variables and because it is more parsimonious and more statistically powerful to have fewer variables in the model, Tuition & Fees was the only revenue variable used in the model.

The second group of control variables includes a series of institutional characteristics. There are four variables in this control group. First, Enrollment was used to control for institutional size (Baum & Lapovsky, 2006; Lapovsky & Loomis-Hubbell, 2003). Enrollment is also an indicator of financial factors such as gross tuition revenue and fixed costs.

Second, the percentage of white, non-Hispanic (Percent White Enrollment) students enrolled was used to measure student racial diversity (Baum & Lapovsky, 2006; Goral, 2003; Heller, 1997; Kane, 1999). A higher percentage represents a higher proportion of white students and, therefore, a less racially diverse student population at the institution.

Third, the percentage of financial aid recipients who were awarded Pell grants (Percent Pell) was used to capture student economic diversity (Baum, 2001; Davis, 2003; Goral, 2003; Redd, 2000). A higher percentage represents a higher proportion of students from a low-income background.

Fourth, *Barron's* Admission Selector Rating (Selectivity) was used as a proxy for institutional selectivity and prestige (*Barron's*, 2003, 2005, 2007; Baum & Lapovsky, 2006; Corey, 2005; Redd, 2000). The level of prestige of an institution is an indicator of the relative weight put on the access and excellence missions, which has the ability to affect tuition discounting policies.

Dependent Variable

The dependent variable for this study was the average Tuition Discount Rate for the institution. It is not directly available through IPEDS; therefore, the Tuition Discount Rate was calculated (Duggan & Mathews, 2005).

Hypotheses

Resource dependence theory informed the development of the hypotheses tested in this study. The hypotheses suggest that institutions can and do adjust their tuition discounting policies based on the availability of and the need for resources.

To test the hypotheses, regression analysis was used. An innovation of this study is its use of variables (the FVI and its component measures) historically reserved for ratio and trend analysis in for-profit enterprises and their application to the analysis of not-for-profit organizations, specifically institutions of higher education. The FVI and its component ratios serve as a proxy for the financial stability of an institution and will, therefore, help to test the hypotheses.

In view of what is known about higher education finance, the financial stability of an institution should constitute a key factor in pricing and discounting decisions. As previously discussed, Trussel et al. (2002) define the values of FVI as they relate to financial vulnerability of an institution closing its doors and ceasing operations in three groups, as follows:

- FVI < .10 indicates an institution that is not financially vulnerable to closing,
- FVI > .20 indicates an institution that is financially vulnerable to closing, and
- .10 ≤ FVI ≤ .20 is inconclusive regarding institutional vulnerability to closing: an evaluation of financial stability cannot be made.

For the purpose of this research, institutional stability relates to financial vulnerability to closing its doors. An institution is stable in that it is not financially vulnerable to closing (FVI < .10). Conversely, an institution is not stable when it is financially vulnerable to closing (FVI > .20).

Based on resource dependence theory, it is reasonable to expect that the more financially stable an institution is, the more likely it is to offer tuition discounts. Conversely, institutions also consider tuition discounts as an investment (Allan, 1999; Corey, 2005), and they may choose to spend heavily on tuition discounts, potentially exchanging short-term financial position for long-term benefits in the form of larger enrollments and/or high-paying students. Recent data show that some institutions will pursue this strategy even when they have unstable growth rates or have shown growing financial vulnerability (Corey, 2005; Goral, 2003; Redd, 2000).

Hypothesis 1

Hypothesis 1 assumes that a particular institution has a stable financial and operating position, that is, an FVI < .10. These institutions can use tuition discounts as a means to increase access for students from low-income backgrounds (Goral, 2003; McPherson & Schapiro, 1999; Slaughter & Rhoades, 2004). From a resource dependence perspective, because the institution is not struggling, the institution does not strive for resources from its students and, therefore, they do not overextend themselves beyond their means when offering tuition discounts. Instead, institutions may choose to offer tuition discounts as resources become available (Figure 1).

Hypothesis 1: If institutions are financially stable (*FVI* < .10), then as financial position increases (FVI decreases), the average Tuition Discount Rate increases.

Given the nature of higher education, as previously discussed, not all institutions are in a financially stable situation. Instead, they struggle in some way to change or improve their institution's position in the higher education market. Because they are resource dependent, they spend money on tuition discounts to increase tuition revenue through larger enrollments or full-paying students (Van Der Werf, 2000).

Hypothesis 2

Assuming that an institution is financially vulnerable and in danger of having to close its doors, it will seek ways to stay in business by initiating emergency policies to continue operating (Van Der Werf, 2000). To increase tuition revenues, the university will actively recruit more students through various strategies, including tuition discounts. Implementation of such a policy has the goal of increasing net tuition, that is, gross tuition revenue less tuition discounts, to keep the institution operational in the short-term and guarantee the long-term viability of the institution (Van Der Werf, 2000; Figure 1).

Hypothesis 2: If institutions are financially unstable (FVI > .20), then as financial position decreases (FVI increases), the average Tuition Discount Rate increases.

ANALYTICAL STRATEGY

The model used for Hypotheses 1 and 2 was an ordinary least-squares regression equation in which the Tuition Discount Rate was the dependent variable and the FVI component measures were the main independent variables. Because it was hypothesized that the outcomes of the dependent variable would be different based on the FVI score, the dataset was examined from a data discontinuity perspective and split into three groups. The three groups were (a) Stable: FVI < .10, (b) Undetermined: .10 ≤ FVI ≤ .20, and (c) Unstable: FVI >.20. Therefore, the equation model used to test the hypotheses for the respective groups is

$$\text{TD Rate} = \alpha + (\beta_{Debt} \times \text{Debt}) + (\beta_{Concen} \times \text{Concen}) + (\beta_{Margin} \times \text{Margin}) + (\beta_{Admin} \times \text{Admin}) + (\beta_{Size} \times \text{Size}) + (\beta_{econ} \times \text{Institutional economic controls}) + (\beta_{inst} \times \text{Institutional characteristics}) + \varepsilon$$

where:
TD Rate = Average tuition discount rate for an institution
Debt = Debt ratio
Concen = Revenue concentration index
Margin = Surplus margin ratio
Admin = Administrative costs ratio
Size = Institutional size in terms of assets
Institutional economic controls = Tuition & Fees
Institutional characteristics = Total Enrollment, Percent White Enrollment, Percent Pell, Selectivity

DATA ANALYSIS

An ordinary least-squares regression was performed in SPSS for each hypothesis. While using the model with all the five component measures was necessary, it provided for a less straightforward evaluation of the results due to the complexity of the model.

Hypothesis 1

For Hypothesis 1, institutions with an FVI < .10 were identified. An ordinary least-squares regression on that subset was performed. The summary of the regression analysis is presented in Tables 1 and 2.

The trend analysis by variable was based on the standardized beta coefficients (β). This information is presented in Tables 1 and 2. A graphical presentation of the average standard beta coefficients (β) for 2003-04 to 2007-08 is in Figures 2 and 3.

The coefficient for the Debt Ratio fluctuated very little year-to-year. The largest changes were from 2003-04 to 2004-05 and 2006-07 to 2007-08, showing increases of .09 and .08, respectively. One explanation may be that the end of the recession of 2001 and the economic

boom that ended in 2007 caused higher consumer and institutional confidence in regard to repaying debt (De Boef & Kellstedt, 2004; Lamdin, 2008). Changes of this nature in the Debt Ratio coefficient, coupled with institutional confidence in repaying debt, may indicate an increasing trend of Debt Ratio coefficients. If this is the case, increased relative debt at an institution may decrease the institution's ability to provide tuition discounts to their students for two reasons: (a) institutional resources are used to fund the unleveraged portions of large-scale capital projects or (b) institutional resources are used to service the debt. In either situation, institutional resources available for tuition discounts would most likely decrease with increased Debt Ratios.

The coefficient for Revenue Concentration Index had a relatively large decrease from 2003-04 to 2004-05, from .23 to -.37, a change of -.60. The cause of this change could have been an institutional reaction to the recession of 2001. Institutions may have experienced a lag time between the recession and its effect on the institution because of the long-term nature of some revenue streams such as grants or research contracts (Breneman, 2002).

The coefficient for Surplus Margin Ratio had a general decreasing trend over the time period of the study. This may be the result of increased financial confidence from the economic boom that ended in 2007, which may have brought about increased hiring or other spending relative to income dollars (Zumeta, 2010).

The coefficient for Administrative Costs Ratio decreased from 2003-04 to 2004-05, from .35 to .05, a change of .30. This decrease may have been an institutional reaction to the recession of 2001. There may have been lag time between the recession and the institution decreasing its administrative costs due to issues such as employee contracts (The Conference Board, 2011; Dadkhah, 2009).

The coefficients for Size Ratio decreased by a relatively large amount from 2003-04 to 2004-05, where it went from .65 to .27, a change of -.38. This, again, may have been an institutional response to the recession of 2001. Assets may have been used and not replaced to manage institutional financial needs while administrators analyzed the direction of the economy and the institution (Goldstein & Meisinger, 2004). In subsequent years, this coefficient appeared to be recovering and showed an increasing trend. Size Ratio ended at .57, which was .07 short of the 2003-04 coefficient value.

The coefficient for Tuition & Fees had some relatively large year-to-year fluctuations, which ranged from a change of -.05 from 2004-05 to 2005-06 to a change of -.19 from 2006-07 to 2007-08. One argument is that these fluctuations may have been caused by the controllable nature of Tuition & Fees (Heller, 1997; Mumper, 2001; Paulsen & St. John, 2002). Institutions may have increased Tuition & Fees in 2006-07 due to the economic boom and perceived price elasticity among their student populations (Leslie & Brinkman, 1987). Then, institutions may have decreased Tuition & Fees in 2007-08 because endowments yielded higher-than-expected returns in the prior year (Van Der Werf, 2007).

The coefficient for Total Enrollment also had some relatively large year-to-year fluctuations, specifically a change of .21 from 2003-04 to 2004-05. The coefficients for Tuition & Fees and Total Enrollment fluctuated in opposite directions each year in almost mirror images of each other. It appears that the coefficients for these two variables are negatively related in that, as tuitions increased (decreased), total enrollment decreased (increased). One argument may be that institutions control Tuition & Fees, but students react to it through enrollment in a cause-effect relationship despite economic conditions (Leslie & Brinkman, 1987).

The coefficient for Percent White Enrollment had a generally increasing trend each year up to 2006-07. The percent of white students (racial diversity) enrolled at institutions is a variable that is long-term in nature, meaning that one would not expect to see large changes in the variable value or the beta coefficient effect size in a one-year period as is indicated here for four years.

The coefficient for Percent Pell had relatively small changes each year except for the change from 2005-06 to 2006-07 of .20. During an economic boom, one would expect the percentage of Pell recipients to decrease each year as households, specifically lower-income households, increase their incomes. This coefficient increase appears to be an anomaly because Pell grants are awarded based on prior year's family income.

The coefficients for Selectivity did not have relatively large changes year-to-year. This is expected, as selectivity is an institutional characteristic that varies very little over time (Martin, 2004).

As noted in the discussion above, most of the coefficients had relatively large fluctuations from 2003-04 to 2004-05, as is apparent in Figure 2. As discussed, this year-to-year fluctuation may have been the result of the institutional response lag time from the recession of 2001.

The coefficients of multiple determination (R^2) for 2003-04 to 2007-08 are included in Tables 1 and 2. The R^2 remained relatively consistent all five years, with only a .05 fluctuation from 2003-04 and 2004-05, the years with the highest value (in 2003-04, $R^2 = .30$, $F[10,238] = 9.14$, $p = .00$; in 2004-05, $R^2 = .30$, $F[10,493] = 19.76$, $p = .00$), to 2007-08, the year with the lowest value ($R^2 = .25$, $F[10,631] = 27.71$, $p = .00$).

For hypothesis 1, numerous coefficients were statistically significant each year as noted in the discussion above and in Tables 1 and 2. In addition, the coefficients generally did not have relatively large fluctuations, except in 2003-04, and the model indicated a good fit. These findings offer support for hypothesis 1.

Hypothesis 2

For hypothesis 2, institutions with an FVI > .20 were identified, and an ordinary least-squares regression on that subset was conducted. The summary of the regression analysis is presented in Tables 3 and 4.

The trend analysis by variable was based on the standardized beta coefficients (β). This information is presented in Tables 3 and 4. A graphical presentation of the average standard beta coefficients (β) for 2003-04 to 2007-08 is seen in Figures 4 and 5.

The coefficient for the Debt Ratio did not change much year-to-year. The largest change was from 2005-06 to 2006-07, increasing from -.06 to .05, a change of .11. Similar to hypothesis 1, one explanation may be that, up until the economic boom ended in 2007, there was high consumer and institutional confidence in repaying debt, even for financially unstable institutions. A change of this nature in the Debt Ratio coefficient, coupled with institutional confidence in repaying debt, may indicate higher Debt Ratios.

The coefficient for Revenue Concentration Index changed each year, decreasing and increasing in alternate years to form a distinct "W" shape. The largest changes occurred from 2004-05 to 2005-06 and 2005-06 to 2006-07, when the changes were .19 and -.26, respectively. The cause of these fluctuations may be related to the instability of the institutions within this

group. Unstable institutions may find additional short-term revenue sources but may not be able to maintain them.

The coefficient for Surplus Margin Ratio was relatively consistent, with a high value of -.03 and a low value of -.23 over the period, except for one year. In 2003-04, the coefficient for Surplus Margin Ratio had its highest value of -.03. One cause of this may be a financial consequence of the recession of 2001. Unstable institutions may generate less revenue and/or incur higher expenses than their financially stable counterparts, which leads to lower surplus margins.

The coefficient for Administrative Costs Ratio changed each year, forming a distinct "V" shape. In 2003-04, the coefficient was positive. In 2004-05 and 2005-06, the coefficients decreased to negative values. In 2006-07 and 2007-08, the values increased, but maintained negative values. Stable and unstable institutions alike grow and expand their administrative structure during times of economic prosperity. The cause of the "V" shaped curve may be that the Administrative Costs Ratio is a lagging indicator of the economic cycle in unstable institutions. The coefficient decreased after the economy came out of the recession of 2001 and then increased after the economic boom began.

The coefficient for Size Ratio had relatively large changes every year, decreasing and increasing in alternate years to form a distinct "W" shape. The largest changes occurred from 2004-05 to 2005-06 and 2005-06 to 2006-07, when the changes were .19 and -.23, respectively. Since the Size Ratio is related to the institutions' assets; it will fluctuate with the size of the institutional asset base. The distinct upward and downward changes in the coefficient may be related to the economic boom and the administration's subsequent decisions on how to manage those assets (i.e., whether to invest or spend the resources). If this is the case, it appears that institutions saved and spent in alternating years.

The coefficient for Tuition & Fees showed relatively large changes from 2003-04 to 2004-05 and again from 2004-05 to 2005-05, where the changes were -.26 and .20, respectively. The coefficient for Total Enrollment also showed relatively large changes from 2003-04 to 2004-05 and again from 2004-05 to 2005-05, where the changes were .29 and -.36, respectively. The coefficients for Tuition & Fees and Total Enrollment fluctuated in opposite directions each year in almost mirror images of each other. It appears that the coefficients for these two variables are negatively related in that, as tuitions increased (decreased), total enrollment decreased (increased). One argument may be that the institutions control Tuition & Fees but that students react to it through enrollment in a cause-effect relationship despite economic conditions.

The coefficient for Percent White Enrollment generally increased over the five-year period, with a relatively large increase from 2004-05 to 2005-06 of .14 to .31 and a relatively large decrease from 2005-06 to 2006-07 of -.22 to .09. The results showed another increase in 2007-08, bringing the coefficient in line with 2003-04 and 2004-05. The percentage of white students (racial diversity) enrolled at institutions is a variable that is long-term in nature, meaning that one would not expect to see large changes in the variable value or the beta coefficient effect size in a one-year period. The cause of the fluctuation may be an anomaly. An alternate explanation may be that it was a self-correcting error in the reporting of this information to IPEDS, with an error made in 2005-06 by which white enrollment was reported as too high. Then the error corrected itself by reporting white enrollment correspondingly too low in 2006-07. In 2007-08, the error was cleared, and the coefficient was aligned with the trend from the years prior to the error.

The coefficient for Percent Pell was generally stable over the five-year period at .03, with an increase from 2004-05 to 2005-06 of .04 to .07 and a relatively large decrease from 2005-06 to 2006-07 of -.14 to -.07. The results showed another increase in 2007-08, bringing the coefficient back to .03, in line with the 2003-04 and 2004-05 coefficient values.

The coefficient for Selectivity stayed relatively consistent each year. This is expected, as selectivity is an institutional characteristic, which is long-term in nature and should not have large changes year-to-year (Martin, 2004).

As noted in the discussion, some of the coefficients changed year-to-year, and in opposite directions, creating "W" and "M" shapes, while other coefficients changed relatively little. As discussed earlier, these patterns may be the result of institutional responses to economic conditions or the changing nature of unstable institutions. These patterns are apparent in Figures 4 and 5.

The coefficients of multiple determination (R^2) for 2003-04 to 2007-08 are included in Tables 3 and 4. The R^2 had a .15 fluctuation from 2007-08, the years with the highest value (R^2 = .49, F[10,104] = 9.05, p = .00), to 2006-07, the year with the lowest value (R^2 = .34, F[10,117] = 8.45, p = .00).

For hypothesis 2, numerous coefficients were statistically significant each year, as noted in the discussion above and in Tables 3 and 4. Additionally, the model coefficients generally showed relatively large fluctuations each year. In spite of this, the model R^2 indicated a good fit each year. These factors offer support for hypothesis 2.

DISCUSSION OF THE RESULTS

This section presents a summary and discussion of the trends seen in the empirical results. Based on the findings, implications for practice, policy, and future research also are presented.

Hypothesis 1

An analysis determined how the component measures reflect improvement in financial position. A challenge arose in analyzing the model due to the nature of the component measures with respect to the hypothesized relationship of the model. Hypothesis 1 asserted that, as the financial position of stable institutions increases, the tuition discount rate also increases. That is, there is a negative relationship between the independent variables and the Tuition Discount Rate since the FVI score decreases as institutional financial stability increases. Because the individual component measures become more favorable by moving in opposite directions, it could not be determined whether the data supported the hypothesis simply by examining every variable for, in this case, a negative coefficient. In response to this constraint, it should be noted that, for Hypothesis 1, Surplus Margin Ratio, Administrative Costs Ratio, and Size Ratio indicate a more favorable financial position when they are larger, and Debt Ratio and Revenue Concentration Index indicate a more favorable financial position when they are smaller. The component measures that are more favorable when they increase (decrease) should show a positive (negative) coefficient in the model. Therefore, the results were examined by variable in terms of the sign of the coefficients (positive or negative) each year to determine whether the data supported Hypothesis 1.

The sign of the standardized beta coefficients (β) for each of the FVI component variables, as shown in Tables 1 and 2 and Figure 2, met these criteria in at least four of the five years in this study. This information is summarized in Table 5.

Between 2003-04 and 2004-05, 6 of the 10 independent variables had large fluctuations in their coefficients. A potential explanation for this is the national economic downturn in 2003. Higher education institutions appear to have responded to the downturn and then adjusted their practices in the subsequent economic upswing.

Different individual variables were statistically significant to the model each year. For example, in 2006, Debt Ratio, Revenue Concentration Index, Size Ratio, Total Enrollment, Percent White Enrollment, and Percent Pell were statistically significant, but in 2003, only Debt Ratio, Size Ratio, Total Enrollment, and Percent White Enrollment were statistically significant. While differences existed each year, of most interest was the explanatory power of the main models as measured by the R^2 and the model fit. As noted in Tables 1 and 2, the mean R^2 = .28 for the combined years suggests a reasonable degree of explanatory power.

In summary, the regression for Hypothesis 1 shows overall negative coefficients for Debt Ratio and Revenue Concentration Index and overall positive coefficients for Surplus Margin Ratio, Administrative Costs Ratio, and Size Ratio. The R^2 indicated reasonable explanatory power, and the model provided a good fit for explanatory purposes as well, as evidenced by the *F*-statistic (Table 6). Therefore, the model supports Hypothesis 1 in that the relationship between Tuition Discount Rate increases and financial position increases (FVI decreases) is statistically significant.

More financially stable institutions used their resources to attract students. When an institution was more stable, as indicated by a lower *FVI*, the Tuition Discount Rate increased. This outcome supports previous research that institutions used tuition discounts as a form of charity or philanthropy for financially needy students (Goral, 2003; McPherson & Schapiro, 1999; Slaughter & Rhoades, 2004), but this outcome extends the findings of previous research and indicates that financially stable institutions used tuition discounts in this manner.

Hypothesis 2

An analysis determined how the component measures reflect deterioration in financial position. As with Hypothesis 1, a challenge arose in analyzing the model due to the nature of the component measures with respect to the hypothesized relationship of the model. Hypothesis 2 asserted that, as the financial position of unstable institutions worsens, the tuition discount rate increases. That is, there is a positive relationship between the independent variables and the Tuition Discount Rate since the FVI score increases as institutional financial stability decreases. Because the individual component measures become less favorable by moving in opposite directions, it could not be determined whether the data supported the hypothesis simply by examining every variable for, in this case, a positive coefficient. In response to this constraint, it should be noted that, for Hypothesis 2, Surplus Margin Ratio, Administrative Costs Ratio, and Size Ratio indicate a less favorable financial position when they are smaller, and Debt Ratio and Revenue Concentration Index indicate a less favorable financial position when they are larger. The component measures that are less favorable when they increase (decrease) should show a positive (negative) coefficient in the model. Therefore, the results were examined by variable in terms of the sign of the coefficients (positive or negative) each year to determine whether the data supported Hypothesis 2.

The sign of the standardized beta coefficients (β) for each of the FVI component variables, as shown in Tables 3 and 4 and Figure 4, met these criteria, as summarized in Table 7.

Because the sign criteria are not met in all of the years of the analysis, this provides for less-straightforward conclusions related to the validity of the hypothesis. While the Debt Ratio, Surplus Margin Ratio, and Administrative Costs Ratio coefficients were, individually, the expected sign (positive or negative) in at least three out of five years, the variables were not statistically significant to the model.

In contrast, Revenue Concentration Index and Size Ratio coefficients, the only main independent variables statistically significant in the model, did not produce the expected sign in any of the years in the study. The unexpected positive coefficient for the Revenue Concentration Index may be related to the semi-controllable nature of this measure. Even though an institution may perform poorly in other financial areas, management may be able to limit some of its risk by diversifying its revenue streams so as not to rely on one or a few sources of revenue to operate the organization. Unstable institutions may have favorable results for this measure if financial executives apply a concerted effort to diversify revenue streams.

The unexpected positive coefficient for the Size Ratio may be the result of the importance of this measure to the institution. An institutional characteristic such as the value of the assets (Size Ratio) is likely to be closely monitored and protected by the institution to ensure that it has the necessary assets and financial resources to operate the institution. In addition, the long-term nature of the Size Ratio, along with the organizational controls in place over institutional assets, typically allows for limited changes on a yearly basis. Large fluctuations and reductions in the level of assets may occur over time.

With respect to all of the independent variables, including the main independent and control variables, the size of the coefficient fluctuations each year ranged from no change to a relatively large change (.36). Variables whose coefficients varied slightly year-to-year appear to be those that are long-term in nature. Institutional characteristics such as the indebtedness of the institution and the racial and economic make-up of the student population are unlikely to fluctuate considerably year-on-year; rather, large changes occur over time.

Variables whose coefficients had large variations year-to-year appear to be those that are short-term in nature. Enrollment and Tuition & Fees, for example, can experience large fluctuations each year. The results indicated that the coefficients for these two variables may have a negative relationship because students may react to changes in tuition through their enrollment decisions. Otherwise, large fluctuations in the coefficients of these variables are related to the fact that unstable institutions are more likely to suffer fluctuations that may result from a number of different factors. The variation is most likely due to the unstable state of the institution and the administrative policies enacted in the attempt to reinvigorate the institution. The policies, while thoughtfully enacted using a particular approach or methodology, may be overly simplistic strategies for short-term cost saving or revenue generation but do not effectively address the underlying business issues of the institution (Cavanaugh & Graves, 2010). Each year, the approach may change until the institution discovers the correct mix of policies to the point where it is no longer unstable. The state of being an unstable institution accounts for the large fluctuations in the variable coefficients each year.

Despite the size of the fluctuation each year, three of the FVI component variable coefficients maintained the same sign over the five-year period. Only the Revenue Concentration Index and Administrative Costs Ratio fluctuated to the point of changing signs.

For both variables, the change in sign may be the result of economic conditions related to the recession of 2001 (Dadkhah, 2009; The Conference Board, 2011).

Additionally, four of the five control variable coefficients maintained the same sign each year. The exception, Percent Pell, was positive in four of the years, but was negative in 2006-07. This may have been caused by an anomaly or an error, as previously discussed. Aside from the size of the fluctuation, most variables maintained the same sign over the time period of the study. In this respect, the coefficient values appear to be stable.

While different individual variables were statistically significant to the model each year, of greatest interest was the explanatory power of the main models as measured by the R^2 and the model fit. Based on the information provided in Tables 3 and 4, on average, the R^2 = .41, suggesting a high degree of explanatory power. The model provided a good fit for explanatory purposes as well, as evidenced by the *F*-statistic (Table 6).

In summary, for Hypothesis 2, the regression results showed expected coefficient signs for Debt Ratio, Surplus Margin Ratio, and Administrative Costs Ratio. Additionally, the signs of the coefficients were generally stable year-to-year. Further, the R^2 indicated that the model has a high degree of explanatory power. Therefore, the model established that the relationship of Hypothesis 2 appears to be valid in that Tuition Discount Rates increase as institutions financial position decreases (FVI increases). Hence, unstable institutions used their resources to attract students, similar to the strategy of stable institutions. When an institution was more unstable, indicated by a higher FVI, the Tuition Discount Rate increased. This outcome supports the hypothesis that unstable institutions spent resources on discounts, which attracted additional students and generated additional revenue (Van Der Werf, 2000).

CONCLUSIONS

Resource dependence theory informs our understanding of the relationship between an institution's financial position and its tuition discount policies. Institutions use their resources through tuition discounts to generate tuition revenue for operations.

Two types of institutions, financially stable and financially unstable, were examined. As financially stable institutions become more financially stable, they increase their Tuition Discount Rates presumably to attract academically gifted students and to provide access to lower-income students. Alternatively, as financially unstable institutions become more financially unstable, they also increase their Tuition Discount Rates to attract students to attend. In each instance, institutions used their resources to attract students, but financially unstable institutions may compromise their long-term financial stability in the process. If financially unstable institutions stretch their financial position too far through tuition discounting policies, they may face financial ruin and may need to close the doors of the institution. This would be detrimental not only to the institution but also to the students due to the decrease in access associated with an institutional closure. Therefore, it is important for higher education administrators to understand the relationship between institutional financial position and tuition discount rates to maintain access for students, especially low-income and disadvantaged students, who may have limited opportunities for their college education.

Implications for Practice

As practitioners, individuals involved in the accounting, budgeting, and strategic financial planning of institutions need guidance and models to assist them in their decision-making processes (Goldstein & Meisinger, 2004). Without guidance or models, and if they choose to succumb to external and/or internal pressures, such as the continued search for resources, advance institutional mission, or the pursuit of excellence (most often, a combination of the three), institutions may compromise their long-term viability. An unchecked outcome could be that an institution "discounts towards disaster" (Redd, 2000). This research highlights the fact that institutional financial aid policies must also take into consideration the present and long-term financial health of the institution.

Second, specific to discounting policies, this research provides financial officers with a better understanding of how their institution's financial position relates to tuition discount rates. Financial officers can calculate their FVI to determine in which FVI group they fit. They can then compare their institution's tuition discount rate to other institutions with a similar FVI score. Based on their analysis, financial officers can gain a better understanding of the implications of certain tuition discounting practices by comparing themselves with peer institutions on the FVI score. Specifically, financial officers can assess how their tuition discounting policies affected the institutional goals of access and excellence based on the number and demographics of students that enrolled.

A third implication is that financial indicators that are already common in business, such as the Debt Ratio and Surplus Margin Ratio, and in academia, such as Percent Pell and Percent White Enrollment, are helpful in the decision-making process of operating the enterprise. This research demonstrates that, similar to for-profit businesses, higher education institutions can use financial ratios to understand enterprise operations. Higher education administrators can then apply this knowledge to performing the day-to-day operations of their institutions. For example, financial officers can use the FVI component ratios to identify potential weaknesses and areas of improvement in the institution's financial position. Once identified, financial officers can investigate the issue and make informed decisions to resolve it.

The ability to identify and resolve issues is especially important given that the economic environment brought about by the Great Recession of 2008 indicates a new status quo for higher education institutions (Bruinicks et al., 2010). Current economic conditions warrant new, resourceful, and practical ways to analyze data. The current research is a starting point for developing quantitative models to evaluate the financial position of institutions. While this research has not established causality, there are indications that the model has some degree of explanatory power, and it may be useful to adopt some of the practices suggested. Additional research is needed, especially more experimental designs, to understand the differences between institutions' policies and related outcomes.

A fourth implication for practice is the robustness of financial indicators to provide information to decision makers. While individuals can use them specifically to inform tuition discounting decisions or a variety of other decisions at the institution level, they are also applicable in a broader scope. Researchers may use financial indicators to explore the relationships between institutional financial position and various resource allocation decisions, such as debt burden, average tuition revenue per full-time equivalent student (FTE), instructional expenditures per FTE, or mean salary of full-time faculty. The versatility of financial indicators is limited only in how scholars choose to apply them in their research.

Implications for Policy

This research provides implications related to institutional policy. One implication, related to resource dependence theory, is that, when an institution chooses how much of its resources to allocate to unfunded tuition reductions, it must balance its mission with other competing priorities. As for other competing priorities, such as expected enrollment size, if growth is a priority or pressure for higher incoming freshman SAT scores when selectivity is a priority, an institution must have a tuition discounting strategy in place to satisfy its competing and conflicting goals, while spending within its limits.

Another important element to consider is the growing trend toward more accountability in higher education, both public and private (Alexander, 2000). For the purpose of this research, the government holds private institutions accountable due to the increasing role of government in providing financial aid in higher education, specifically Pell grants. A previous study found that, as government grants to students increased, tuition prices increased so that the institution could fully benefit from the increased grant dollars (Dynarski, 2000). Given the current economic circumstances and the federal government's desire to provide more affordable higher education to all Americans, institutions may be under increased government scrutiny, particularly in regard to tuition price increases and increased tuition discounting. As such, institutions must consider policy decisions related to tuition prices and tuition discounting in the current accountability environment.

Implications for Future Research

While there is significant potential for future research, the following recommendations may be considered the most important. First, further studies on the financial aspects of higher education institutions should be done because research in this area has yet to be the focus of scholars, and it would provide a wealth of information about the ways in which the financial aspects of institutions relate to institutional decision making processes. Additional research in this area could include the effect of debt on institutions of different enrollment sizes, selectivity categories, or Carnegie classifications; the impact of funded versus unfunded programs and liabilities on the institution, such as tuition discounts or employee retirement liabilities; and the adherence to contractual requirements related to account transfers performed between funds, especially with regard to restricted and temporarily restricted funds.

A second direction would be to study institutions longitudinally. Research of this nature could help increase understanding of the institutional changes over time that lead to changes in FVI scores and discounting policies. For example, studies could identify common changes in institutional characteristics that lead to FVI improvements or increases in tuition discount rates. The analysis of longitudinal data also could provide a single equation model by FVI group, as opposed to a different model each year as was done in the current study, to be used by financial officers.

Third, the Great Recession provides for a natural experiment of a financial shock to all institutions. Additional research could be performed to determine the validity of the FVI composite variable in determining financial stability. The results would provide insight into its usefulness for internal and external financial analysis purposes.

The final direction of future research is to use a case-study approach for institutions that have failed or have restructured their operations in recent years. Studying institutions such as

Vanguard University in California may offer insights into which accounts or financial indicators could have predicted an institution's failure months or years in advance. The results might provide ways to identify financial problems early enough to resolve them. Such research also could examine whether discounting policies had a relationship to the institution's financial trouble.

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APPENDIX

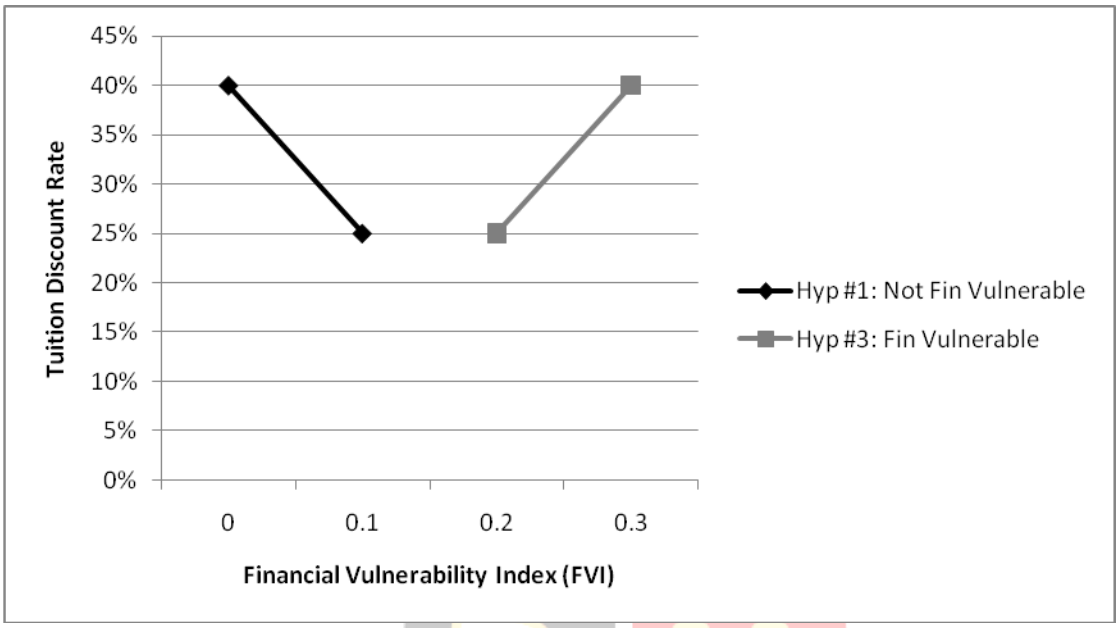

Figure 1. Hypothesized general relationship between institutional financial position and tuition discount rates.

Table 1

Summary of Regression Analysis for Variables Predicting Tuition Discount Rate Using FVI Component Measures as the Main Independent Variables for FVI < .10 for 2003-04 to 2005-06

	2003			2004			2005		
Variable	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
(Constant)	-0.67	0.15		-0.12	0.14		-0.49	0.15	
Debt	-0.18	0.06	-.17**	-0.09	0.05	-.08	-0.15	0.05	-.12**
Concen	0.00	0.00	.23	-0.45	0.05	-.37**	-0.25	0.05	-.23**
Margin	0.02	0.04	.25	0.16	0.05	.14**	0.07	0.05	.06
Admin	0.07	0.08	.35	0.08	0.07	.05**	-0.03	0.08	-.02
Size	0.05	0.01	.65**	0.03	0.01	.27**	0.04	0.01	.42**
Tuition & Fees	2.77E-11	0.00	.02	-1.71E-10	0.00	-.11**	-2.60E-10	0.00	-.16
Total Enroll	-8.11E-06	0.00	-.40**	-5.15E-06	0.00	-.19**	-5.38E-06	0.00	-.19*
Percent White Enroll	7.83E-04	0.00	.13*	1.08E-03	0.00	.15**	1.63E-03	0.00	.21**
Percent Pell	0.04	0.05	.06	0.01	0.04	.01*	0.06	0.05	.06
Selectivity	-0.01	0.02	-.03	1.80E-03	0.01	.01	1.64E-03	0.01	.01

Note. In 2003, R^2 = .30, F(10,238) = 9.14, p = .00. In 2004, R^2 = .30, F(10,493) = 19.76, p = .00. In 2005, R^2 = .26, F(10,485) = 18.04, p = .00.

* p < .05, ** p < .01

Table 2

Summary of Regression Analysis for Variables Predicting Tuition Discount Rate Using FVI Component Measures as the Main Independent Variables for FVI < .10 for 2006-07 to 2007-08

	2006			2007		
Variable	*B*	*SE B*	β	*B*	*SE B*	β
(Constant)	-0.80	0.16		-0.81	0.13	
Debt	-0.15	0.05	-.12**	-0.05	0.05	-.04
Concen	-0.30	0.05	-.26**	-0.31	0.04	-.26**
Margin	0.04	0.06	.04	0.09	0.05	.09
Admin	0.13	0.07	.09	0.06	0.07	.04
Size	0.05	0.01	.52**	0.05	0.01	.57**
Tuition & Fees	-9.21E-11	0.00	-.06	-3.61E-10	0.00	-.25**
Total Enroll	-7.73E-06	0.00	-.29**	-4.41E-06	0.00	-.16*
Percent White Enroll	2.20E-03	0.00	.31**	1.68E-03	0.00	.24**
Percent Pell	0.28	0.06	.26**	0.20	0.04	.20**
Selectivity	-3.55E-03	0.01	-.01	5.68E-04	0.01	.00

Note. In 2006, R^2 = .28, $F(10,520)$ = 23.66, p = .00.
In 2007, R^2 = .25, F(10,631) = 27.71, p = .00.
* p < .05, ** p < .01

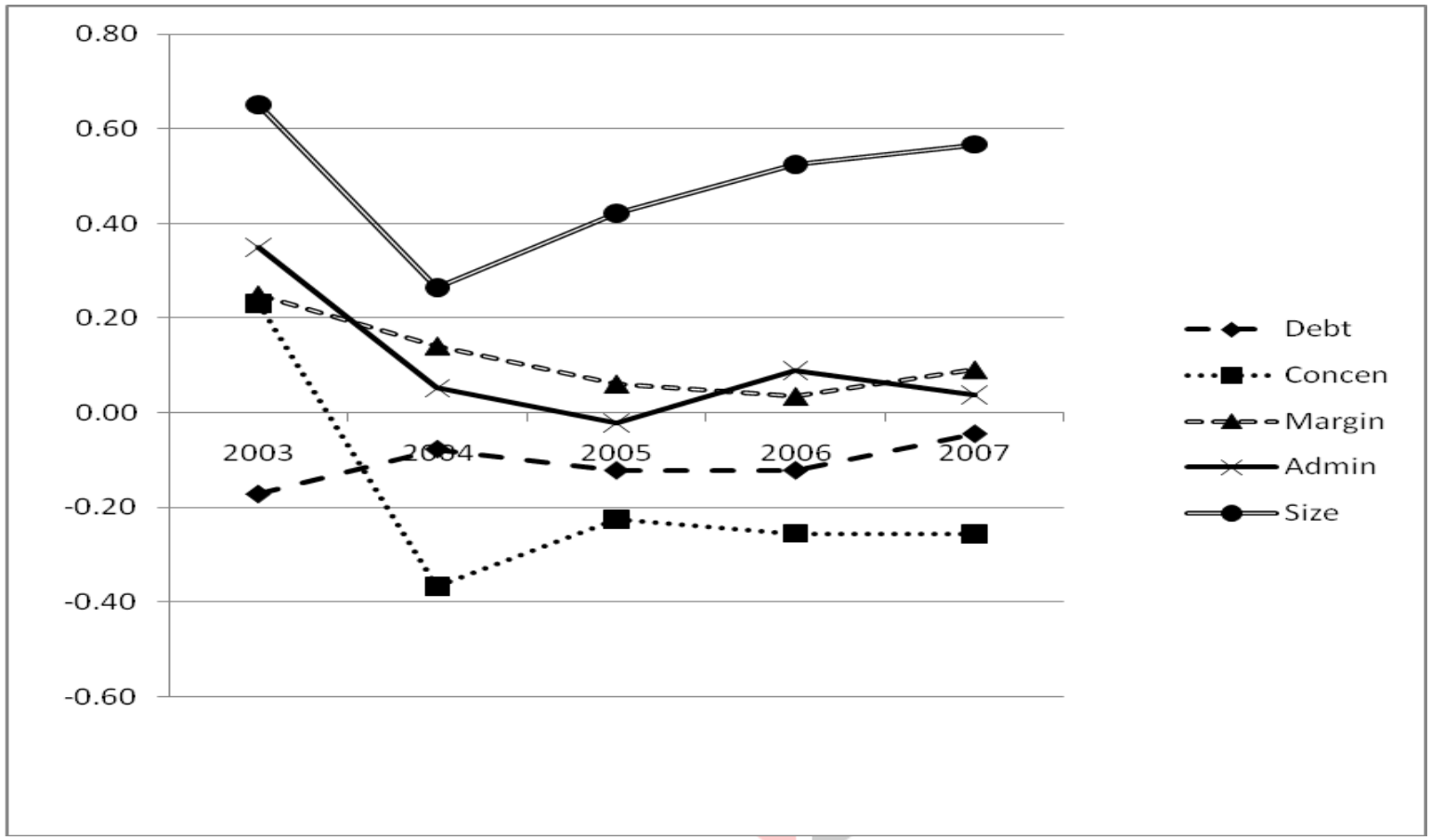

Figure 2. Main independent variable trends by standardized beta coefficients (β): FVI < .10: Stable.

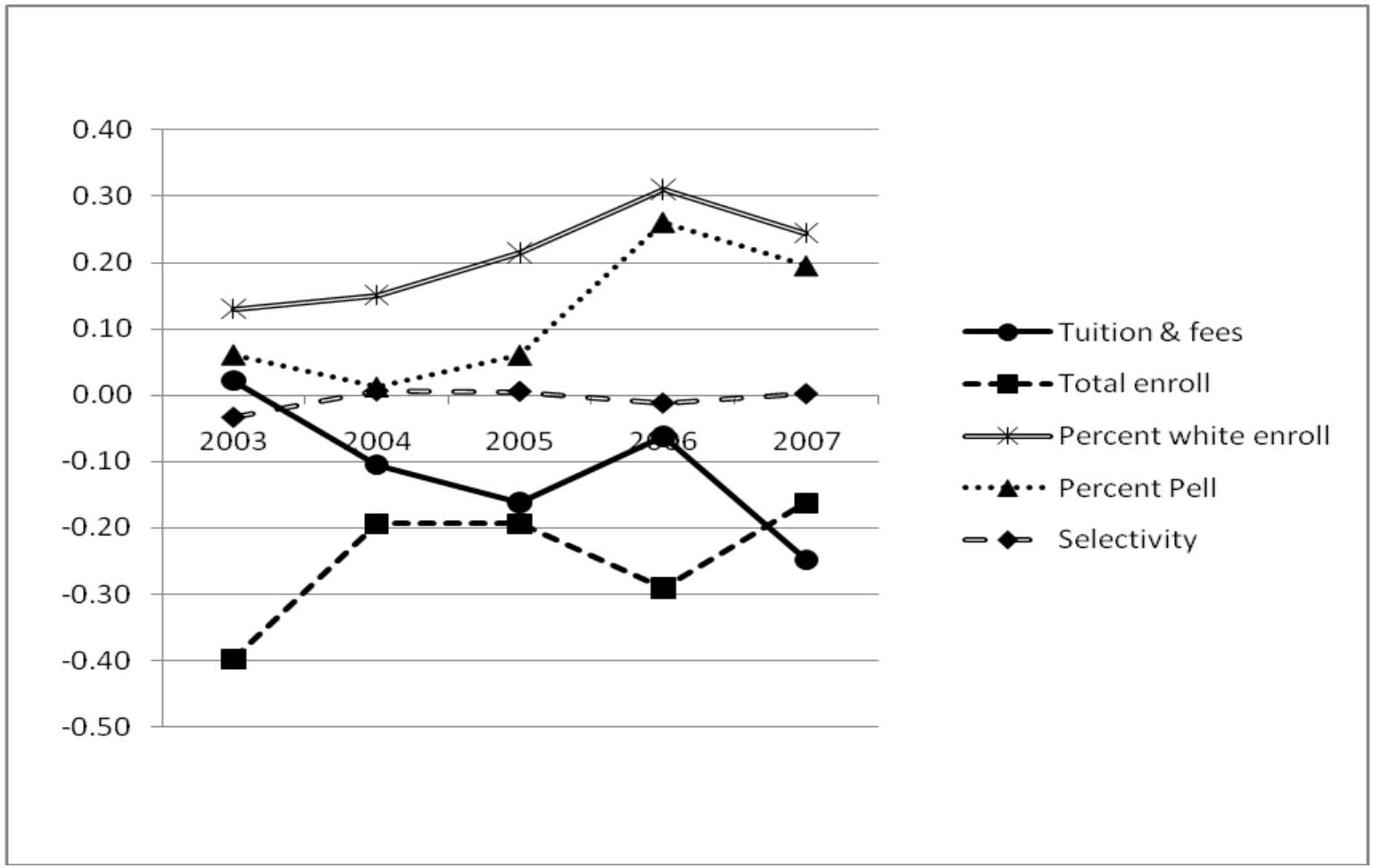

Figure 3. Control variable trends by standardized beta coefficients (β): FVI < .10: Stable.

Table 3

Summary of Regression Analysis for Variables Predicting Tuition Discount Rate Using FVI Component Measures as Main Independent Variables for FVI > .20 for 2003-04 to 2005-06

	2003			2004			2005		
Variable	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
(Constant)	-0.79	0.16		-0.53	0.25		-1.03	0.23	
Debt	0.00	0.03	.01	-0.01	0.05	-.03	-0.04	0.05	-.06
Concen	-0.25	0.05	-.29**	-0.24	0.07	-.34**	-0.03	0.03	-.15
Margin	-0.03	0.06	-.03	-0.19	0.13	-.20	-0.15	0.10	-.23
Admin	0.08	0.07	.07	-0.08	0.11	-.08	-0.25	0.10	-.25**
Size	0.06	0.01	.56**	0.05	0.01	.41**	0.08	0.02	.60**
Tuition & Fees	-3.27E-09	0.00	-.23**	-5.11E-09	0.00	-.49**	-4.98E-09	0.00	-.29*
Total Enroll	1.43E-05	0.00	.10	4.38E-05	0.00	.39**	2.22E-06	0.00	.03
Percent White Enroll	1.36E-03	0.00	.16**	1.11E-03	0.00	.17**	1.95E-03	0.00	.31**
Percent Pell	0.02	0.04	.03	0.02	0.06	.03	0.05	0.06	.07
Selectivity	0.00	0.02	-.01	-0.03	0.03	-.07	-0.06	0.04	-.12

Note. In 2003, R^2 = .44, F(10,193) = 19.54, p = .00. In 2004, R^2 = .39, F(10,100) = 6.11, p = .00. In 2005, R^2 = .39, F(10,112) = 8.25, p = .00.

* p < .05, ** p < .01

Table 4

Summary of Regression Analysis for Variables Predicting Tuition Discount Rate Using FVI Component Measures as Main Independent Variables for FVI > .20 for 2006-07 to 2007-08

	2006			2007		
Variable	*B*	*SE B*	β	*B*	*SE B*	β
(Constant)	-0.49	0.25		-0.54	0.22	
Debt	0.03	0.04	.05	0.02	0.03	.04
Concen	-0.34	0.07	-.41**	-0.24	0.06	-.36**
Margin	-0.08	0.06	-.51	-0.06	0.04	-.18
Admin	-0.11	0.09	-.14	-0.04	0.06	-.05
Size	0.05	0.01	.37**	0.05	0.01	.45**
Tuition & Fees	-1.20E-09	0.00	-.11	-1.18E-09	0.00	-.15
Total Enroll	9.92E-06	0.00	.07**	9.15E-06	0.00	.08
Percent White Enroll	5.78E-04	0.00	.09**	1.20E-03	0.00	.22**
Percent Pell	-0.07	0.08	-.07**	0.02	0.07	.03
Selectivity	-0.05	0.03	-.10**	-0.03	0.03	-.07

Note. In 2006, R^2 = .34, $F(10,117)$ = 8.45, p = .00.
In 2007, R^2 = .49, $F(10,104)$ = 9.05, p = .00.
* $p < .05$, ** $p < .01$

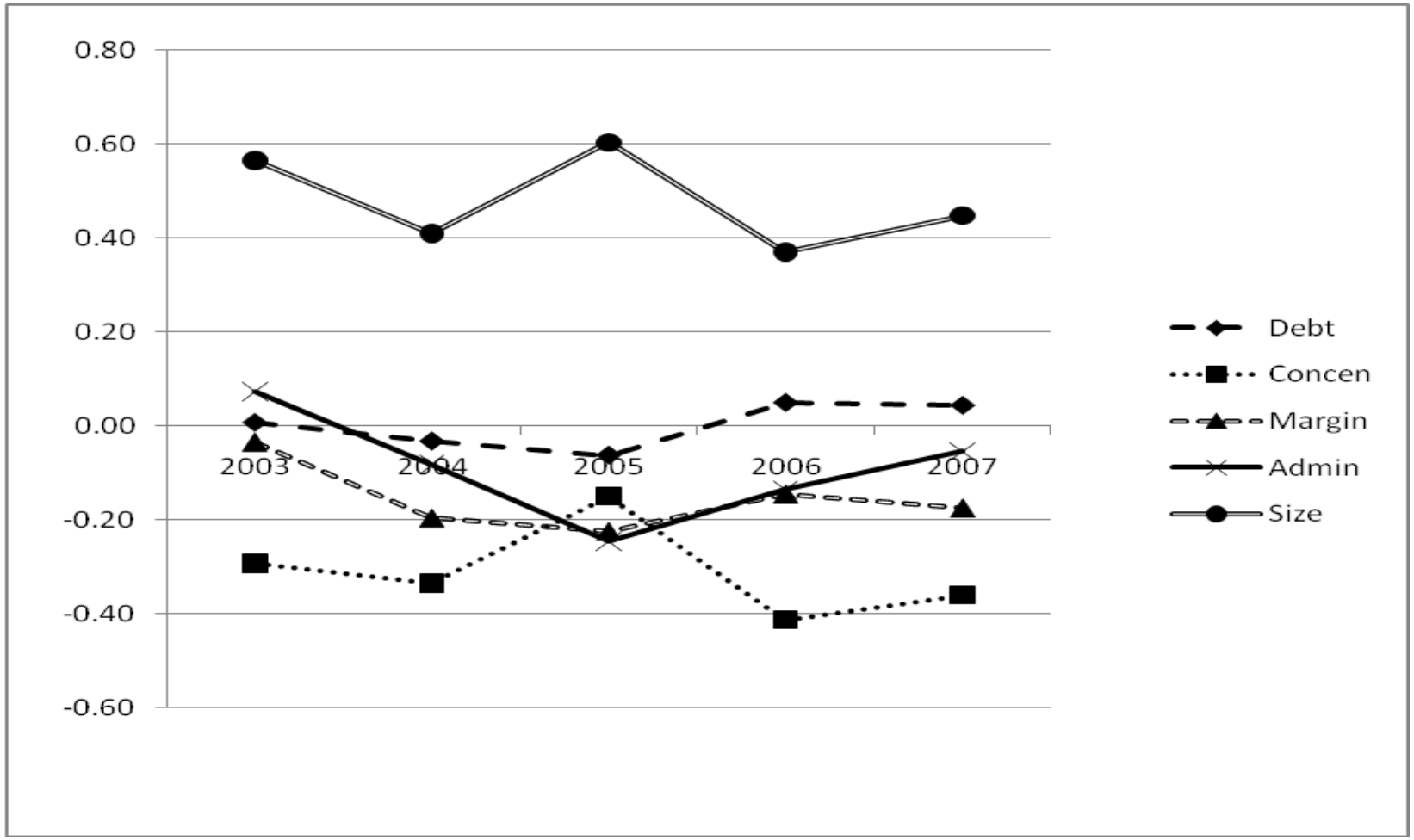

Figure 4. Main independent variable trends by standardized beta coefficients (β): FVI > .20: Unstable.

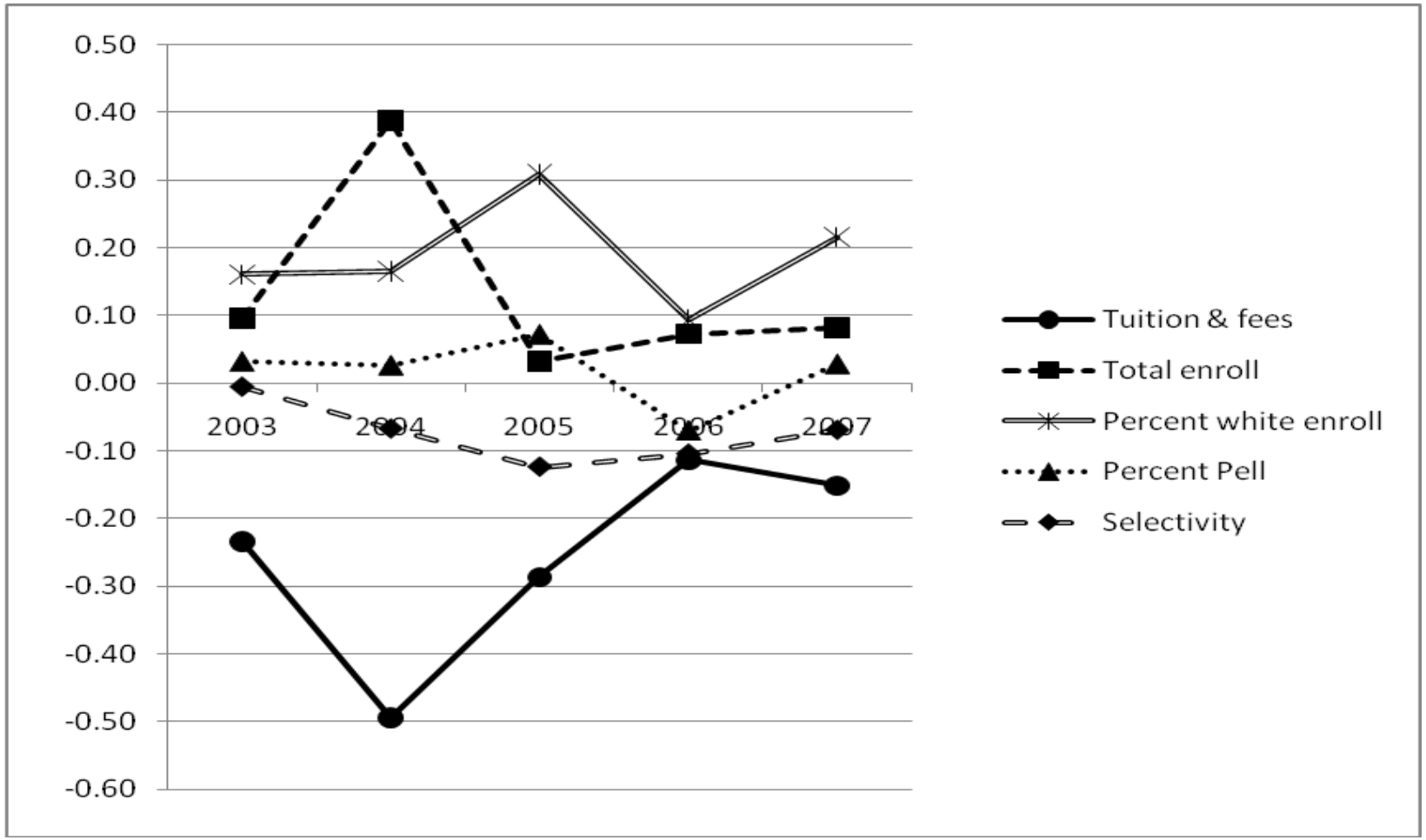

Figure 5. Control variable trends by standardized beta coefficients (β): FVI > .20: Unstable.

Table 5
Summary of Signs and Criteria for β Coefficients for Hypothesis 1: Stable

Variable	Variable More Favorable When	Years Coefficient Meets Criteria
Debt	-	5
Concen	-	4
Surplus	+	5
Admin	+	4
Size	+	5

Table 6
Summary of Goodness of Fit Measures by Hypothesis

	Hypothesis 1: Stable			Hypothesis 2: Unstable		
Year	R^2	*F*	*p*	R^2	*F*	*p*
2003	0.30	9.14	.00	0.44	19.54	.00
2004	0.30	19.76	.00	0.39	6.11	.00
2005	0.26	18.04	.00	0.39	8.25	.00
2006	0.28	23.66	.00	0.34	8.45	.00
2007	0.25	27.71	.00	0.49	9.05	.00

Table 7
Summary of Signs and Criteria for β Coefficients for Hypothesis 2: Unstable

Variable	Variable More Favorable When	Years Coefficient Meets Criteria
Debt	+	3
Concen	+	0
Surplus	-	5
Admin	-	4
Size	-	0